

25. Which of these steps should not be part of a CVEK pulpotomy?

- A. Removing hyperplastic tissue until you reach healthy pulp tissue
- B. Remove all tissue coronal to the amputation site
- C. Calcium Hydroxide is pushed into the remaining pulp
- D. Pressure with saline moistened cotton pellets

**ANSWER:** C: Calcium Hydroxide is pushed into the remaining pulp

“Cvek has shown that, in exposures resulting from traumatic injuries, pulpal changes are characterized by a proliferative response, with inflammation extending only a few millimeters into the pulp. When the hyperplastic tissue is removed, healthy pulp is found. Care should be taken to remove all the tissue coronal to the amputation site to prevent continuation of bleeding, contamination, and discoloration of the tooth. In teeth with carious exposure, it might be necessary to remove tissue to a greater depth in order to reach noninflamed pulp. After pulp amputation, the preparation is thoroughly washed with saline and dried with cotton pellets.

Hemorrhage is controlled with cotton pellets slightly moistened with saline; the use of dry cotton pellets carries the risk of fibers being incorporated into the clot and causing hemorrhage during clot removal. If hemorrhage persists, amputation should be performed at a more apical level, using a small endodontic spoon or a round diamond bur. Once hemorrhage has been controlled and the blood clot removed, a dressing of calcium hydroxide is gently placed over the amputation site. Care should be taken not to push the material into the pulp as it might cause inflammation, increasing the potential for failure of the procedure; on the other hand, if the pulpotomy is successful, such material in the pulp may create a tendency for calcific obliteration of the pulp. A creamy mix of zinc oxide and eugenol or other cement is flowed over the calcium hydroxide and allowed to set. When a composite is used, eugenol compounds must be avoided, as these cements interfere with the setting reactions of the composite. In these cases, a second layer of glass ionomer is placed. Recently MTA has been utilized to replace the calcium hydroxide in pulpotomy procedures.”

*Pinkham, Jimmy R. Pediatric Dentistry: Infancy Through Adolescence, 4th Edition. Mosby, 2005. 33.3.4.1*

26. NiTi wires share the following properties except:

- A. Shape memory
- B. Superelasticity
- C. Can exist in more than one crystal structure
- D. Poor shape memory

**Answer:** A. Shape memory

Stainless steel wires – better strength and springiness w/ better corrosion resistance than precious metal wires that they replaced. Typical formulation is 18% chromium and 8% nickel and often called 18-8 SS. Properties can be controlled over wide range by changing amount of cold working and annealing during manufacture. Steel is softened by annealing and hardened by cold working. Steel ligatures used to tie ortho arch wires to brackets are made from such “dead soft” wire.

Nickel-Titanium (NiTi) alloys – Developed for the space program and has exceptional springiness. Have shape memory and superelasticity. Exists in more than one form of crystal structure. Martensite form exists at lower temperatures and austenite form at higher temperatures. Both shape memory and superelasticity are related to phase transitions within NiTi alloy between the martensite and austenite forms.

Beta-Titanium (TMA) – A titanium alloy with a good combination of strength and springiness to provide excellent resilience with good formability. Good choice for auxiliary springs and for intermediate and finishing arch wires. Properties are intermediate between SS and M-NiTi.

*Contemporary Orthodontics. Proffit, Fields and Sarver. 4<sup>th</sup> edition.*

**27.** After a 7-14 day application of formocresol, the pulps developed three distinctive zones. They include all of the following except:

- a. A broad eosinophilic zone of fixation
- b. A broad pale-staining zone with poor cellular definition
- c. A zone of inflammation diffusing apically into normal pulp tissue
- d. An odontoblastic zone covering a normal pulp tissue

**Answer: D**

A detailed histologic investigation of the effect of formocresol on the pulps of human primary and permanent teeth was conducted. A broad eosinophilic zone of fixation, a broad pale-staining zone with poor cellular definition, and a zone of inflammation diffusing apically into normal pulp tissue were all found 7 to 14 days out.

With calcium hydroxide, one of the zones found with it is a relatively normal pulp tissue, slightly hyperemic, underlying an odontoblastic layer is found.

*Ingle JJ, Bakland LK. Endodontics volume 1. PMPH-USA, 2002; pages 876-882.*

**28.** The ideal conditions for serial extractions include all of the following except:

- a. No skeletal disproportions
- b. Excessive overbite
- c. Class I molar relationship
- d. A large arch perimeter deficiency (10mm or more)

**ANSWER:** B. A normal overbite is ideal in serial extraction cases.

In its classical form, serial extraction applies to patients who meet the following criteria: 1. No skeletal disproportions, 2. Class I molar relationships, 3. Normal overbite, 4. Large arch perimeter deficiency (10mm or more). The procedure consists of 4 steps.

1. Extraction of the primary lateral incisors as the permanent central incisors erupt (if necessary, since this often happen naturally in severely crowded cases).
2. Extraction of the primary canine as the permanent laterals erupt
3. Extraction of the 1<sup>st</sup> primary molars usually 6 to 12 months before their normal exfoliation, at the point when the underlying premolars have one half to two thirds of their roots formed
4. Extraction of the permanent first premolars before eruption of the permanent canines

*Orthodontics 3rd edition, Proffit, William; pg 227*

**29.** Initial calcification of the maxillary and mandibular primary incisors:

- a. Coincide, at birth
- b. Coincide, *in Utero*
- c. Mandibular precedes maxillary, at birth
- d. Maxillary is initiated *in Utero* where mandibular is initiated at birth

**Answer: b**

Kraus and Jordan found that the first microscopic indication of morphologic development occurs at about 11 weeks in Utero (I.U.). It is interesting to note that the developmental dates listed precedes by about 3-4 weeks the dates that appear in the chronology of the human dentition, as developed by Logan and Kronfeld.

Remember: Maxillary central incisors slightly precede the Mandibular central incisors.

***Primary Teeth***

Maxillary	Central Incisor	Lateral Incisor	Canine	First Molar	Second Molar
Initial Calcification	14 weeks <i>I.U.</i>	16 weeks <i>I.U.</i>	17 weeks <i>I.U.</i>	15.5 weeks <i>I.U.</i>	19 weeks <i>I.U.</i>
Crown Completed	1.5 months	2.5 months	9 months	6 months	11 months
Root Completed	1.5 years	2 years	3.25 years	2.5 years	3 years
Eruption	10 months	13 months	20 months	16 months	27 months
Mandibular	Central Incisor	Lateral Incisor	Canine	First Molar	Second Molar
Initial Calcification	14 weeks	16 weeks	17 weeks	15.5 weeks	18 weeks
Crown Completed	2.5 months	3 months	9 months	5.5 months	10 months
Root Completed	1.5 years	1.5 years	3.25 years	2.5 years	3 years
Eruption	8 months	13 months	20 months	16 months	27 months

***Permanent Teeth***

Maxillary	Central Incisor	Lateral Incisor	Canine	First Premolar	Second Premolar	First Molar	Second Molar
Initial Calcification	3 months	10 months	4 months	1.5 years	2 years	at birth	2.5 years
Crown Completed	4 years	4 years	6 years	5 years	6 years	2.5 years	7 years
Root Completed	10 years	11 years	13 years	12 years	12 years	9 years	14 years
Eruption	6 years	7 years	11 years	10 years	10 years	6 years	12 years
Mandibular	Central Incisor	Lateral Incisor	Canine	First Premolar	Second Premolar	First Molar	Second Molar
Initial Calcification	3 months	3 months	4 months	1.5 years	2 years	at birth	2.5 years
Crown Completed	4 years	4 years	6 years	5 years	6 years	2.5 years	7 years
Root Completed	9 years	10 years	12 years	12 years	13 years	9 years	14 years
Eruption	6 years	7 years	10 years	10 years	11 years	6 years	12 years

Reference: R. McDonald, DDS, MS, D. Avery, DDS, MSD, J. Dean, DDS, MSD, "Dentistry for the child and adolescent", Eighth edition, 2004.

30. The name of this appliance is a
- A. TPA appliance
  - B. LLHA appliance
  - C. Nance appliance
  - D. Bilateral distal shoe appliance



**Answer C.**



The Nance appliance is a space maintainer used for the maxillary arch only. Bands are placed on the first permanent molars or 2<sup>nd</sup> primary molars. The appliance provides cross palatal bracing preventing rotation and mesial drifting of the 1<sup>st</sup> permanent molars when the 1<sup>st</sup> or 2<sup>nd</sup> primary molars are lost prematurely. The acrylic button provides an additional stop.



The Lingual holding arch. The objective is to retain the mandibular right and left first permanent molars in a normal Class I dental relationship and to prevent the tendency of mandibular incisors to tip lingually. The fixed lingual arch appliance is used where there are multiple losses of primary teeth.



Distal shoe or band and loop space maintainers are placed on either the maxillary or mandibular arch to prevent mesial drifting after premature loss of a first or second primary molar. The distal shoe is typically placed immediately after extraction of the primary 2<sup>nd</sup> molar to prevent mesial movement of the permanent 1<sup>st</sup> molar.



The Transpalatal arch space maintainer can be used for cross-anchorage if only one of the primary second molars is lost and both permanent first molars are erupted. It is effective in preventing mesial drifting of the maxillary first permanent molars and is more hygienic than the Nance transpalatal bar.

*Pediatric Dentistry total patient care; Stephen Wei, 1988.  
Management of space in the primary and mixed dentition. P 454-463*

*Fundamental of pediatric dentistry 2<sup>nd</sup> revised edition; Arch length loss. P385-394.*

*Dentistry for the child and adolescent. 8<sup>th</sup> edition, Management of the developing occlusion. P 626-646*

**31.** The most frequently reported dental signs of an active non-nutritive sucking habit include all of the following except:

- a. Mesially inclined maxillary molars
- b. Anterior open bite
- c. Facial movement of the upper incisors and lingual movement of the lower incisors
- d. Maxillary constriction

**ANSWER:** A. Mesially inclined maxillary molars

The duration of digit sucking habits (months or years) is positively related to an increased prevalence of anterior open bite or reduced overbite, increased overjet, greater maxillary arch depth, and decreased maxillary arch width. The most frequently reported dental signs of an active habit are the following:

1. Anterior open bite
2. Facial movement of the upper incisors and lingual movement of the lower incisors
3. Maxillary constriction

Anterior open bite, or the lack of vertical overlap of the upper and lower incisors when the teeth are in occlusion, develops because the digit rests directly on the incisors. This prevents complete or continued eruption of the incisors, whereas the posterior teeth are free to erupt.

Usually, the thumb is placed so that it exerts pressure on the lingual surface of the maxillary incisors and on the labial surface of the mandibular incisors. A child who actively sucks can create enough force to tip the upper incisors facially and the lower incisors lingually.

Maxillary arch constriction is probably due to the change in equilibrium balance between the oral musculature and the tongue. When the thumb is placed in the mouth, the tongue is forced down and away from the palate. The orbicularis oris and buccinator muscles continue to exert a force on the buccal surfaces of the maxillary dentition, especially when these muscles are contracted during sucking. Because the tongue no longer exerts a counterbalancing force from the lingual surface, the posterior maxillary arch collapses into crossbite.

Pinkham, Jimmy R. *Pediatric Dentistry: Infancy Through Adolescence, 4th Edition*. Mosby, 2005.

**32.** The most frequently reported dental signs of an active non-nutritive sucking habit include all of the following except:

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- c. Facial movement of upper incisors and lingual movement of lower incisors
- e. Maxillary constriction

**ANSWER:** A. Mesially inclined maxillary molars

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*Pinkham, Jimmy R.. Pediatric Dentistry: Infancy Through Adolescence, 4th Edition. Mosby, 042005. 26.1*

**33.** Which of the following medications is safe for treating the asthmatic child?

- A. Barbiturates
- B. Tylenol
- C. Advil
- D. Aspirin
- E. Codeine

**Answer:** B. Tylenol

Barbiturates and narcotics aren't indicated because of potential for histamine release leading to a bronchospasm. Aspirin compounds and NSAIDs are also contraindicated because of 4% of patients experience wheezing after taking these drugs. Acetaminophen is recommended.

Asthma is a very common childhood disease, affecting 1 in 10 children. It is a chronic airway disease characterized by inflammation and bronchial constriction. Asthma is a diffuse obstructive disease of the airway caused by edema of mucous membranes, increased mucous secretions, and spasm of smooth muscle. Three fourths of childhood asthma is mild, with minimal daily symptoms and short-lived exacerbations. It is twice as common in prepubertal boys but affects both sexes equally during adolescence and adulthood.

Before initiating treatment the dentist should know the frequency of attacks, their severity, when was the last attack and if the patient was hospitalized, medications, limitations to activity and what brings them on.

Etiology includes biochemical, immunologic, infectious, endocrine, and psychologic factors. Typical symptoms of asthma are coughing, wheezing, chest tightness, and dyspnea. Clinical onset may occur over minutes (acute) or hours & days. An acute attack is associated with exposure to irritants such as cold air, fumes, or dust, and it may develop in minutes. An attack developing over days is usually brought on by viral respiratory infection. Severe bronchial constriction results in labored breathing, wheezing, tachypnea, profuse perspiration, cyanosis, hyperventilation, tachycardia, and sometimes chest pain. A dental procedure constitutes an acute irritant to the airways of the asthmatic child and may precipitate an attack. Patient taking bronchodilators should take a dose prior to treatment and should bring their inhalers to the office. Behavioral methods to decrease anxiety should be employed. Patients should be in an upright or semiupright position for the dental procedure are beneficial.

*Reference: McDonald, Avery & Dean. Dentistry for the Child and Adolescent, 2004. 8<sup>th</sup> edition.*

**34.** Which drug used in general sedation for pediatric dental patients has been shown to increase the heart rate?

- a. Midazolam (Versed)
- b. Ketamine
- c. Meperidine (Demerol)
- d. Diazepam (Valium)

**Answer: B**

Ketamine has been commonly used for analgesia and amnesia. Ketamine has also been shown to affect other systems of the body. Effects on the respiratory system are generally beneficial. It has been well documented as a bronchodilator and it causes minimal respiratory depression with only mild hypercapnia (increased amount of CO<sub>2</sub> in the blood) in clinically relevant doses. Protective airway reflexes are more likely to be preserved with ketamine than with other IV anesthetics. However, increased oral secretions can occur. Ketamine also often produces significant increases in blood pressure and heart rate.

*Kohrs R, Durieux ME. Ketamine: Teaching an Old Drug New Tricks. Anesth Analg. 1998; 87: 1186–93.*  
*Wynn RL, Meiller TF, Crossley HL. Drug Information Handbook for Dentistry 14<sup>th</sup> edition, 2008*

**35.** Common complications of molar uprighting include all of the following except:

- a. Extrusion
- b. Relocating infected crevicular tissue further subgingivally
- c. Excessive mobility
- d. Devitalization of the molar being up-righted

**ANSWER d.**

Devitalization does not routinely occur when teeth undergo orthodontic movement.

Tipping a tooth distally generally extrudes it. This has the merit of reducing the depth of the pseudopocket found on the mesial surface, and since the attached gingiva follows the CEJ while the MGJ remains stable, it also increases the width of the keratinized tissue in that area. In contrast, maintaining the existing occlusal level as the tooth uprights will require intrusion, which carries with it at least the theoretic possibility of relocating infected crevicular tissue further subgingivally.

Mechanics (pg 627) – the best approach is to use a modern highly flexible wire initially, and a 17X25 NiTi usually is a good choice. Excessive mobility of the teeth being uprighted can result from either too much force or (more likely if the modern NiTi and beta-Ti wires are used) failure to reduce the occlusal interferences.

*Contemporary Orthodontics, Profitt, William, 3<sup>rd</sup> edition, pgs 620-627.*

**36.** All of the following statements are correct regarding fibrotomy except:

- a. It should be done after any pre-orthodontically rotated teeth have been corrected
- b. It should be done before debonding after mild overcorrection (3-5 degrees)
- c. The overcorrection is removed 3 weeks after the fibrotomy procedure
- d. Fiberotomy should be accomplished before the impression for retainers is made

**Answer: c**

Fibrotomy should be done after any pre-orthodontically rotated teeth have been corrected, especially maxillary and mandibular anterior teeth (e.g. Maxillary lateral incisors with class II, Div 2 problems). The procedure should be done before debonding after mild overcorrection (3-5 degrees). The overcorrection is removed 1 week after the surgical procedure and before impression for retainers is made.

*Reference: T. Graber, DMD, MSD, R. Vanarsdall, Jr, DDS, K. W.L. Vig, BDS, MS, "Orthodontics: Current principles and techniques", Fourth edition, 2005.*

37. Which of the following is not an advantage of the Moyers arch length analysis?

- It can be completed in the mouth as well as on casts
- A prediction table is not needed
- It may be used for both arches
- Uses the mandibular incisors to predict the size of the upper, as well as the lower, posterior teeth
- It requires a complete set of periapical radiographs.

**Answer: E.**

The M-D width of the lower incisors is measured and this number is used to predict the size of both the lower and upper unerupted canines and premolars.

"The analysis advocated by Moyers has numerous advantages. It can be completed in the mouth as well as on casts, and it may be used for both arches. The analysis is based on a correlation of tooth size; one may measure a tooth or a group of teeth and predict accurately the size of the other teeth in the same mouth. The mandibular incisors, because they erupt early in the mixed dentition and may be measured accurately, have been chosen for measurement to predict the size of the upper, as well as the lower, posterior teeth. "Currently the Nance arch-length analysis is seldom used, partly because the involved procedures for this analysis require a complete set of periapical radiographs. The clinical reliability of other analyses that do not use radiographs is sufficient for determining major arch-length inadequacies."

"The Tanaka and Johnston method of arch-length analysis is a variation of Moyer's analysis except that a prediction table is not needed. The estimated widths in millimeters of the unerupted canines and premolars correspond to the 75% level of probability in Moyers' prediction table".

**PROBABILITY CHART FOR PREDICTING THE SUM OF THE WIDTHS OF 345 FROM 21112**

21112 =	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	25.0
95%	21.6	21.8	22.1	22.4	22.7	22.9	23.2	23.5	23.8	24.0	24.3	24.6
85%	21.0	21.3	21.5	21.8	22.1	22.4	22.6	22.9	23.2	23.5	23.7	24.0
75%	20.6	20.9	21.2	21.5	21.8	22.0	22.3	22.6	22.9	23.1	23.4	23.7
65%	20.4	20.6	20.9	21.2	21.5	21.8	22.0	22.3	22.6	22.8	23.1	23.4
50%	20.0	20.3	20.6	20.8	21.1	21.4	21.7	21.9	22.2	22.5	22.8	23.0
35%	19.6	19.9	20.2	20.5	20.8	21.0	21.3	21.6	21.9	22.1	22.4	22.7
25%	19.4	19.7	19.9	20.2	20.5	20.8	21.0	21.3	21.6	21.9	22.1	22.4
15%	19.0	19.3	19.6	19.9	20.2	20.4	20.7	21.0	21.3	21.5	21.8	22.1
5%	18.5	18.8	19.0	19.3	19.6	19.9	20.1	20.4	20.7	21.0	21.2	21.5

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85%	20.5	20.8	21.1	21.4	21.7	22.0	22.3	22.6	22.9	23.2	23.5	23.8
75%	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1	23.4
65%	19.8	20.1	20.4	20.7	21.0	21.3	21.6	21.9	22.2	22.5	22.8	23.1
50%	19.4	19.7	20.0	20.3	20.6	20.9	21.2	21.5	21.8	22.1	22.4	22.7
35%	19.0	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0	22.3
25%	18.7	19.0	19.3	19.6	19.9	20.2	20.5	20.8	21.1	21.4	21.7	22.0
15%	18.4	18.7	19.0	19.3	19.6	19.8	20.1	20.4	20.7	21.0	21.3	21.6
5%	17.7	18.0	18.3	18.6	18.9	19.2	19.5	19.8	20.1	20.4	20.7	21.0

McDonald and Avery, *Dentistry for the Child and Adolescent*, 1988 Mosby. 630-1.



**38.** The final step in the Tanaka-Johnston space analysis is to subtract the width of the lower incisors and \_\_\_\_\_ the calculated premolar and canine width (both sides) from the total arch length approximation.

- A. Half
- B. Two times
- C. Four times
- D. Three quarters

**ANSWER:** B. Two times

The Tanaka-Johnston analysis is most clinically useful because it requires no additional radiographs or tables to predict tooth size. The first step in the Tanaka-Johnston analysis is to determine the available arch length. The distance from the mesial of the permanent first molar to the mesial of the contralateral permanent first molar is measured by dividing the arch into several segments. Each segment is measured over the contact points and incisal edges of the teeth. The segments are added together to provide an approximation of total arch length. The second step in the analysis is measurement of the width of the four mandibular incisors. The widths of the four incisors are added together to determine the amount of room necessary for ideal alignment. The mesiodistal width of the unerupted mandibular canine and premolars in one quadrant is predicted by adding 10.5 mm to half the width of the four lower incisors. The final step in the space analysis is to subtract the width of the lower incisors and two times the calculated premolar and canine width (both sides) from the total arch length approximation. If the result is positive, there is more space available in the arch than is needed for the unerupted teeth. If the result is negative, the unerupted teeth require more space than is available to erupt in ideal alignment.

*Pinkham, Jimmy R.. Pediatric Dentistry: Infancy Through Adolescence, 4th Edition. Mosby, 2005.*

**39.** Tanaka and Johnston used the width of the lower incisors to predict the size of what unerupted teeth?

- A. Maxillary and Mandibular Canines and Premolars
- B. Maxillary and Mandibular Incisors and Canines
- C. Maxillary Canines and Premolars
- D. Mandibular Canines and Premolars

Answer: **A. Maxillary and Mandibular Canines and Premolars**

Space analysis requires comparison between amount of space available for the alignment of teeth and the amount of space required to align them properly. Analysis can be done directly on casts or by a computer algorithm. The first step is calculation of space available, and this is done by measuring the perimeter from the mesial of one first molar to the other over the contact points and incisal edges of anterior teeth. The second step is to calculate the amount of space required for alignment of teeth, by measuring the mesiodistal width of each erupted tooth from contact to contact, estimating the size of unerupted permanent teeth and then summing the widths of individual teeth. If the sum of the widths of the permanent teeth is greater than the amount of space available, there is an arch perimeter space deficiency and crowding would occur. If available space is larger than the space required (excess space), spacing can be expected.

There are three ways to estimate the size of unerupted permanent teeth: measuring them on radiographs, estimating them using proportionality tables (Tanaka & Johnston), and a combination of the two.

*Contemporary Orthodontics. Proffit, Fields and Sarver. 4<sup>th</sup> edition, 2007.*

**40.** The primate space is:

- A. Between the lateral incisors and canines in the maxillary
- B. Between the lateral incisors and canines on the mandible
- C. The difference in space between the maxillary primary molars and permanent premolars
- D. The difference in space between the permanent molars and primary premolars

**Answer: A**

The primate space describes the space found between the lateral incisor to the canine in the maxillary and the canine to the molar in the mandible. There are spaces throughout the anterior teeth, but these are most noticeable.

Leeway space describes the difference in size between primary molars and permanent premolars for both the maxillary and mandibular dentition. The mandibular primary second molar is 2mm larger than the second premolar, and the maxillary primary second molar is 1.5mm larger. The primary first molar is only slightly larger in the maxillary compared to the permanent premolar, but it is 0.5mm larger in the mandible. This constitutes 2.5mm excess for the mandibular arch and 1.5mm excess in the maxillary arch for each quadrant.

*Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics 4<sup>th</sup> edition. Mosby Elsevier 2007.*

**41.** Which statement is true?

- a. A flush terminal plane primary molar occlusion predicts a class III permanent molar relationship
- b. A mesial step primary molar occlusion predicts a class II permanent molar relationship
- c. A distal step primary molar occlusion predicts a class II permanent molar relationship
- d. There is no predictive value in primary molar relationships

**ANSWER: C.** A distal step

There are 3 relationships of the primary second molars: Mesial step, distal step and flush terminal plane. They describe the relation of the mandibular to the maxillary primary second molars (i.e. = mandibular molar is mesial to the maxillary molar). Flush terminal plane is the normal relationship. The developmental paths are as follows.

Distal Step = Class II or end to end

Flush terminal Plane = End to End or Class I

Mesial Step = Class I or class III

*Proffit, Contemporary orthodontics 3<sup>rd</sup> edition p 90, 217.*

**42.** To fully define the changes in the position of a tooth during orthodontic tooth movement, one must use which plane(s) of reference:

- a. Buccolingual plane
- b. Mesiodistal plane
- c. Buccolingual and Mesiodistal planes
- d. Buccolingual, Mesiodistal and Transverse planes

**Answer: d**

Tooth movement is often described in general terms: tipping, bodily movements, and root movement. More specific description can be devised by locating a center of rotation relative to three mutually perpendicular planes which are (1) Buccolingual or Labiolingual plane oriented through the long axis of the tooth, (2) a Mesiodistal plane also oriented through the long axis of the tooth and (3) a transverse plane that intersects Buccolingual and Mesiodistal planes at right angles.

To define fully the changes in the position of a tooth, one must use all 3 planes of reference.

Reference: T. Graber, DMD, MSD, R. Vanarsdall, Jr, DDS, K. W.L. Vig, BDS, MS, "Orthodontics: Current principles and techniques", Fourth edition, 2005.

**43.** The clinical appearance of the teeth in severe early childhood caries in a child 2,3,or 4 years of age is typical and follows a definite pattern. Which of the following is correct?

- a. The mandibular canines and incisors are usually unaffected.
- b. The mandibular and maxillary incisors are usually affected.
- c. The mandibular incisors are usually unaffected.
- d. The mandibular incisors are affected first.

**Answer: C**

"For many years it has been recognized that, after eruption of the primary teeth begins, excessively frequent bottle feedings and/or prolonged bottle or breast feedings is often associated with early and rampant caries. The clinical appearance of the teeth in severe early childhood caries in a child 2,3,or 4 years of age is typical and follows a definite pattern. There is early carious involvement of the maxillary anterior teeth, the maxillary and mandibular first primary molars, and sometimes the mandibular canines. The mandibular incisors are usually unaffected. Dentistry for the child and adolescent. Dental caries in the child and adolescent. "

*McDonald and Avery, Dentistry for the Child and Adolescent, 1988 Mosby. P 209*

ECC is an infectious disease. There are about 600 types of bacteria in our mouths. We are not born with the bacteria that cause dental disease, *strep mutans*; we acquire it, usually from our caregivers. The following are characteristics of ECC, formerly known as Baby Bottle Tooth Decay:

- 1) The onset of ECC can be 12 to 18 months or earlier! 2) It develops rapidly. Progression from the enamel (the thin, hard, outer layer of the tooth) into the dentin (the softer, inner layer of the tooth) occurs in six months or less. Once the decay is in the dentin, because it is so soft, the tooth can be destroyed in as little as six weeks!
- 3) The upper front teeth are affected first. These teeth usually erupt at around eight months of age. 4) Primary molars, which begin to erupt at about 12 months of age, are the next teeth to be affected. 5) Finally, the lower front teeth are affected when the disease becomes very severe. Currently, ECC is recognized as an infectious disease. Its extent and severity vary with cultural, genetic and socio-economic influences. According to the American Association of Pediatric Dentists, the decay level in three to five year old U.S. Head Start children may be as high as 90 percent in some populations.

*Health.nv.gov/PDFs/PH/ECClongversiontext.pdf*

44. Which of the following is not an indication for beginning interceptive orthodontics:

- A. Delaying may make later treatment more difficult and complex
- B. Prevent asymmetry from becoming worse
- C. Alter growth so that asymmetry improves
- D. Early treatment ensures that further treatment will not be needed

**ANSWER:** D. Early treatment ensures that further treatment will not be needed

Skeletal problems are addressed only if there is progressive asymmetry as a result of a functional disturbance. The reason for treating these patients early is that treatment at a later time may be more difficult and complex if the child continues to grow asymmetrically and if dental compensation increases. The goal of early treatment is to prevent the asymmetry from becoming worse or to alter growth so that the asymmetry improves. The majority of progressive asymmetry patients are treated first with removable functional appliances that are designed to alter growth by manipulating skeletal and soft tissue relationships and allowing differential eruption of teeth. Orthognathic surgery is a second treatment for progressive asymmetry but is reserved for patients with the most severe asymmetry or those whose condition does not respond to functional appliance therapy. It may be necessary to operate a second time when the child is older because growth often tends to remain asymmetric even after surgical correction. Because diagnosis and treatment of progressive asymmetry are difficult, it is recommended that these cases be referred to a specialist for evaluation and treatment.

Early treatment of patients with dentofacial anomalies is also advocated. Dentofacial anomalies include a number of environmentally and genetically induced conditions that alter the relationship of the facial structures. Examples of such anomalies include cleft lip and palate, hemifacial microsomia, Crouzon's and Apert's syndromes, and mandibulofacial dysostosis (Treacher Collins syndrome). A specialist or specialty team works to minimize the facial disfigurement through early surgical and orthodontic intervention.

*Pinkham, Jimmy R. Pediatric Dentistry: Infancy Through Adolescence, 4th Edition. Mosby, 2005.27.1*

45. A mother brings her 4 year old child in to your office for an exam. After noting three carious lesions you ask the mother what is the child's fluoride exposure. She states that the fluoride level was tested in their drinking water at home and was estimated to be 0.40 ppm F, and that the majority of the water the child drinks is at home. How much fluoride supplementation, if any, would you prescribe the child?

- A. 0 mg daily
- B. 0.25 mg daily
- C. 0.50 mg daily
- D. 1.00 mg daily

**Answer:** B 0.25 mg

Age	Fluoride ion level in drinking water (ppm)*		
	Less than 0.3ppm	0.3-0.6 ppm	Greater than 0.6 ppm
Birth-6 months	None	None	None
6 months-3 years	0.25 mg/day**	None	None
3-6 years	0.50 mg/day**	0.25 mg/day	None
6-16 years	1.0 mg/day	0.50 mg/day	None

\*0.1 part per million (ppm) = 1 milligram/liter (mg/L)

\*\*2.2 mg sodium fluoride contains 1 mg fluoride ion

If children don't have the benefit of drinking water containing optimum fluoride concentration, supplements should be prescribed in accordance with the dosages listed above. Supplementation should continue through the time of the eruption of the second permanent molars.

*Reference: McDonald, Avery, Dean. Dentistry for the Child and Adolescent. Eighth edition, 2004.*

- 46.** Treatment of a primary tooth that has been intruded should include the following except:
- Intruded primary teeth should be observed; with few exceptions, no attempt should be made to reposition them after the accident.
  - The tooth should be repositioned and splinted for 3 to 4 weeks.
  - If the primary tooth is evaluated to have been intruded in the lingual toward the permanent tooth bud, the primary tooth should be extracted.
  - An examination should be performed with radiographs including a lateral radiograph to determine the location of the primary tooth in relation to the permanent tooth bud.

**Answer: B**

Intrusion by forceful impaction in the maxillary primary anterior dentition is a common occurrence for children during the first 3 years of life. Intruded primary teeth should be observed; with few exceptions, no attempt should be made to reposition them after the accident. These injuries often occur at an age when it would be difficult to splint or construct a retaining appliance to stabilize the repositioned teeth. Often, the maxillary primary tooth will displace labial keeping it safe from the developing lingual tooth bud. When the tooth is displaced to the lingual, an evaluation including a lateral PA should be performed to determine if the permanent tooth bud has been involved. If it has been involved, the primary tooth should be extracted. Primary teeth that have been intruded due to forceful trauma often erupt within 3 to 4 weeks after the injury.

*McDonald RE, Avery DR, Dean JA. Dentistry for the Child and Adolescent 8<sup>th</sup> edition. Mosby 2004.*

- 47.** Which statement is true concerning space management in the primary maxillary incisor region?
- Space closure rarely occurs in the primary maxillary anterior region when primary incisors are lost
  - The indication for replacing lost primary maxillary incisors is for cosmetic purposes only
  - Spacing of maxillary primary anterior teeth is an indication for space maintenance
  - No previous spacing is an indication for space maintenance in the primary anterior region

**ANSWER: D.**

"Some dentists believe that space closure rarely occurs in the anterior part of the mouth, but this is not true; each case must be evaluated critically. It is important to consider the occlusion and the degree of spacing, if any, between the anterior teeth. If the anterior primary teeth were in contact before the loss or there is evidence of an arch-length inadequacy in the anterior region, a collapse in the arch after the loss of one of the primary incisors is almost certain. Even when spacing is present, it may be desirable to construct a partial denture or a fixed appliance to reproduce a desirable esthetic appearance, to reestablish function, or to prevent abnormal speech and tongue habits. Removable appliances are contraindicated in high caries risk children."

"The loss of anterior permanent teeth requires immediate treatment by the dentist if intraarch changes are to be prevented. Within a few days after the loss of a tooth as a result of trauma or extraction of a severely traumatized tooth, the teeth adjacent to the space will begin to drift, and often within a few weeks several millimeters of space will be lost."

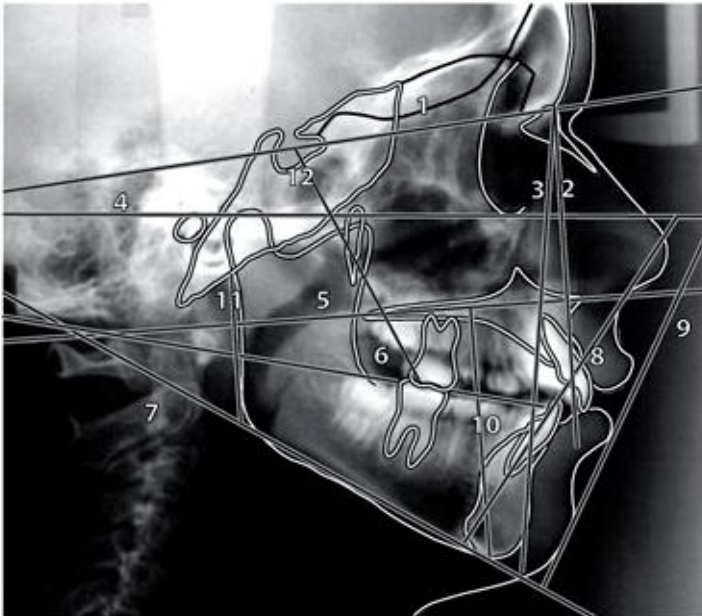
If any degree of space closure has occurred, the space should be regained, if possible, before construction of a space maintainer. A partial denture-activating appliance can be used successfully in this procedure if there is no need for bodily movement of teeth”

McDonald; Avery; Dean; *Dentistry for the Child and Adolescent* 8<sup>th</sup> edition, 2004 pgs 638-640

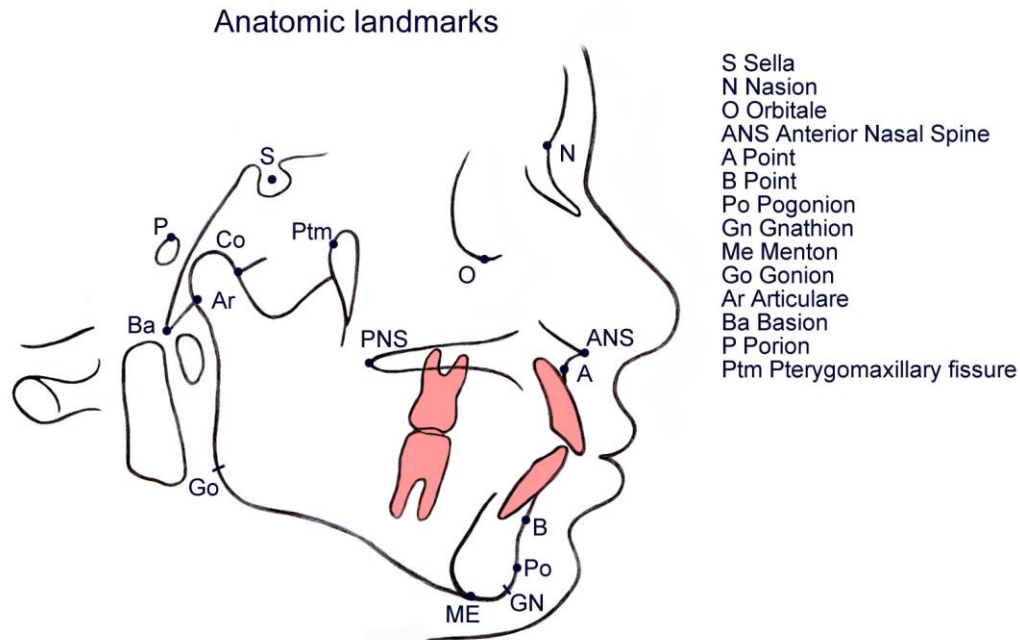
48. A line through what two Cephalometric landmarks represent Frankfort horizontal:

- a. Porion and Nasion
- b. Sella and Nasion
- c. Orbitale and Porion
- d. Sella and Orbitale

Answer: C



**FIGURE 1** - Cephalometric landmarks. 1. SN line, 2. NA line, 3. NB line, 4. Frankfort plane, 5. Palatine plane, 6. Occlusal plane, 7. Mandibular plane, 8. Lower incisor line, 9. Profile line, 10. Anterior facial height, 11. Posterior facial height, 12. Y Axis.



Reference: P. Tukan, M. de Araújo Magnani, D. Nouer, P. Nouer, I. Uglik Garbui, *Craniofacial analysis of the Tweed Foundation in Angle Class II, division 1 malocclusion*, Braz. oral res. vol.19 no.1, Paulo 2005.

49. A variety of local factors may influence a tooth to erupt or try to erupt in an abnormal position. Which of the following general factors influence the development of an ectopic eruption?

- A. High tongue position coupled with a strong mentalis muscle
- B. Thumb or finger habits cause abnormal forces on the dental arch
- C. Arch-length inadequacies and other forms of malocclusion, particularly class II, division I
- D. teeth actively erupting adjacent to the space left by the premature loss of a primary tooth
- E. All of the above

**Answer.** E. All of the above

Arch length inadequacy, tooth mass redundancy, or a variety of local factors may influence a tooth to erupt or try to erupt in an abnormal position. Occasionally this condition may be so severe that actual transposition of teeth takes place". P.183

"A tooth is maintained in its correct relationship in the dental arch as a result of the action of a series of forces. If one of these forces is altered or removed, changes in the relationship of the adjacent teeth will occur and will result in drifting of teeth and the development of a space problem. The following general factors influence the development of a malocclusion.

1. Abnormal musculature. High tongue position coupled with a strong mentalis muscle may damage the occlusion after the loss of a mandibular primary molar. A collapse of the lower dental arch and distal drifting of the anterior segment will result
2. Oral habits. Thumb or finger habits cause abnormal forces on the dental arch and are responsible for initiating a collapse after the untimely loss of teeth.
3. Existing malocclusion. Arch-length inadequacies and other forms of malocclusion, particularly class II, division I, usually become more severe after the untimely loss of mandibular primary teeth.
4. Stages of occlusal development . In general more space loss is likely to occur if teeth are actively erupting adjacent to the space left by the premature loss of a primary tooth".

*Ref. McDonald and Avery, Dentistry for the Child and Adolescent, 1988 Mosby, p.632*